WHAT IS CLAIMED IS:

1. (currently amended) An apparatus for illuminating a test material in a light profile microscope, comprising:

a source of radiation providing a source beam propagating along a beam axis [['x';]] x;

an anamorphic optical means providing, from the source beam emitted by said source of radiation, a source beam elliptically collimated over an [['x']] x axial collimation region having a distance comprised in a range between micromcters and meters, and having a major elliptic axis oriented along a first transverse axis [['y']] y, and a minor elliptic oriented along a second transverse axis [['z';]] z;

a test material positioned to intersect the elliptically collimated source beam within the [['x']] x axial collimation region to form an irradiated volume, said test material comprising an image transfer ~~(IT)~~ surface oriented substantially parallel to the [['x']] x axis and substantially orthogonal to the z [['z']] axis, said ~~IT~~ image transfer surface transmitting radiation emitted from said irradiated volume in said test material;

an optical imaging system ~~(OIS)~~ forming an image, at an image plane, of the illuminated volume in the test material from the radiation transmitted by the ~~IT~~ image transfer surface; said ~~OIS~~ optical imaging system defining an object plane conjugate to the image plane and aligned to contain the major elliptic axis of the collimated source beam intersecting said test material in the illuminated volume, an object depth of focus of said

~~OIS~~ optical imaging system being maintained at a value of approximately at least 1/5 of a radius of the elliptically collimated source beam along the [['z']] z axis in the axial collimation region of the elliptically collimated source beam; and

image receiving means receiving the image formed by said ~~OIS~~ optical imaging system in the image plane thereof;

wherein said apparatus yields a high image resolution and wide image field.

2. (currently amended) The apparatus according to claim 1 , wherein said anamorphic optical means includes ones of cylindrical and toroidal optical elements that independently collimate the source beam along orthogonal axes [['y' and 'z']] y and z transverse to the beam propagation axis [['x']] x .

3. (currently amended) The apparatus according to claim 1, wherein the ~~IT~~ image transfer surface transmits radiation emitted one of scattering, luminescence and blackbody emission from the irradiated volume in the test material.

4. (currently amended) The apparatus according to claim 1, wherein said optical imaging system ~~(OIS)~~ comprises at least one of lenses, mirrors and a combination thereof.

5. (original) The apparatus according to claim 1, wherein said image receiving means comprises means for at least one of recording, displaying, storing and a combination thereof.

6. (original) The apparatus according to claim 1 , wherein said source of radiation is a laser, said anamorphic optical means is an anamorphic collimator comprising a combination of at least ones of cylindrical lenses and mirrors, the irradiated volume of the test material emits luminescence, and said image receiving means is a high sensitivity CCD camera.

7. (original) The apparatus according to claim 6, wherein said test material emits elastic scatter from the irradiated volume.

8. (currently amended) The apparatus according to claim 6, wherein said test material emits Raman scatter from the irradiated volume and said optical imaging system ~~(OIS)~~ further comprises an optical filter that selects a narrow range of emitted wavelengths to form the image at the CCD camera.

9. (currently amended) The apparatus according to claim 6, wherein said test material emits luminescence from the irradiated volume and said optical imaging system

~~(OIS)~~ further comprises an optical filter that selects a narrow range of emitted wavelengths to form the image at the CCD camera.

10. (original) The apparatus according to claim 6, wherein said laser is a high intensity laser that thermally excites the test material's irradiated volume causing chemi-luminescence to be emitted from the irradiated volume.

11. (original) The apparatus according to claim 1 , wherein said source of radiation is a broadband radiation source emitting polychromatic radiation, said anamorphic optical means is an anamorphic collimator comprising one of a combination of cylindrical lenses and a combination of anamorphic mirrors, the irradiated volume of said test material emits elastic scatter, and said image receiving means is a CCD camera.

12. (currently amended) The apparatus according to claim 1 , wherein the object depth of focus of said optical imaging system ~~OIS~~ is maintained at a value comprised between 1/5 and 5 times the radius of the elliptically collimated source beam along the[['z']] z axis in the axial collimation region of the elliptically collimated source beam.

20. (currently amended) A method for illuminating a test material in a light profile microscope comprising a source of radiation, an anamorphic collimator, an optical imaging system and an image recording means, said method comprising the steps of:

propagating a source beam emitted by the source of radiation along a beam propagation axis [['x']] x;

elliptically collimating the source beam along orthogonal axes [['y' and 'z']] y and z transverse to the beam propagation axis [['x']] x to yield a elliptically collimate source beam over an [['x']] x axial collimation region having a distance comprised in a range between microns and meters, and having a major elliptic axis oriented along the transverse axis [['y']] y and a minor elliptic oriented along the transverse axis [['z';]] z;

intersecting the elliptically collimated source beam within the [['x']] x axial collimation region with a test material to form an irradiated volume in the test material by said intersecting, and aligning an image transfer ~~(IT)~~ surface of the test material substantially parallel to the [['x']] x axis of the elliptically collimated source beam and substantially orthogonal to the [['z']] z axis of the elliptically collimated source beam;

collecting image radiation emitted from the irradiated volume in the test material and transmitted through the ~~IT~~ image transfer surface by an optical imaging system ~~(OIS)~~;

forming an image at a fixed image plane with the optical imaging system ~~OIS~~ by aligning an object plane thereof conjugate to the image plane thereof at a central axis of the irradiated volume in the test material;

maintaining an object depth of focus of the optical imaging system ~~OIS~~ at a value that is approximately at least 1/5 of a radius along the [['z']] z axis of the elliptically collimated source beam in the [['x']] x axial collimation region; and

recording the image formed by the optical imaging system ~~OIS~~ in the image plane.

21. (currently amended) The method according to claim 20, wherein said collecting image radiation emitted from the irradiated volume in the test material and transmitted through the ~~IT~~ image transfer surface by an optical imaging system ~~(OIS)~~ comprises collecting an image radiation emitted by one of scattering, luminescence and blackbody emission from the irradiated volume in the test material.

22. (currently amended) The method according to claim 20, wherein said recording the image formed by the ~~OIS~~ optical imaging system in the image plane is done with one of a camera and an image recording means.